60,130-1001
99MRA0206

#11/Appeal Brief 4-10-03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant: Spurr

Group Art Unit: 3682

Serial No. 09/784,466

Examiner: Joyce, William C.

Filed: February 15, 2001

For: ACTUATOR ASSEMBLIES

Commissioner of Patents
BOX AF
Washington, D.C. 20231

APPEAL BRIEF UNDER 37 C.F.R. § 1.192

Sir:

This is an Appeal Brief under 37 C.F.R. § 1.192 appealing the Final Rejection of the Primary Examiner dated October 31, 2002 (Paper No. 7). Each of the topics required by 37 C.F.R. § 1.192 is presented in this Brief and is labeled appropriately.

A check in the amount of $320 is enclosed for the filing fee. If any additional fees or extensions of time are required, please charge to Deposit Account No. 50-1482, in the name of Carlson, Gaskey & Olds.

I. REAL PARTY IN INTEREST

Meritor Light Vehicle Systems (UK) Limited is the real party in interest of the present application. An assignment of all rights in the present application to Meritor Light Vehicle Systems (UK) Limited was executed by the inventor and recorded by the U.S. Patent and Trademark Office at Reel 011564, Frame 0370.

II. RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences related to the present application of which the Appellant is aware.

III. STATUS OF CLAIMS

Claims 1-7 and 15-21, which are presented in the Appendix, stand finally rejected. Claims 8-14 have been withdrawn from consideration. Accordingly, the Appellant hereby appeals the final rejection of claims 1-7 and 15-21.

IV. STATUS OF AMENDMENTS

Following a first, non-final Office Action dated April 29, 2003, Appellant filed an Amendment dated July 24, 2003 amending independent claim 1 and adding new claim 21.

Following a final Office Action dated October 31, 2002, Appellant filed a proposed After Final Amendment on December 30, 2002 adding proposed new claims 22-29. The Examiner refused to enter the proposed After Final Amendment in an Advisory Action dated January 14, 2003.

V. SUMMARY OF INVENTION

The claimed invention is directed to an actuator assembly 10 having a spring 20 that biases an output member 18 and a motor 14 that drives the output member 18 in two different directions. When the output member 18 is in a rest condition, the spring 20 is compressed, storing energy within it. Teeth in a work gear 22 and worm wheel 24 as well as frictional forces prevent the stored energy in the spring 20 from turning the motor 14 (Fig. 1; p. 3, lines 13-19).

When the motor 14 applies force in a first direction, it drives the output member 18 from the rest condition to an actuated condition. In the example shown in Figure 1, the motor 14 applies force toward the right, in the same direction as the biasing force of the spring 20. As a result, the force of the spring 20 assists the motor 14 in driving the output member 18 toward the right to the actuated condition. The combined force from the spring 20 and from the motor 14 provides a greater total force than either the spring 20 or the motor 14 alone (p. 4, lines 8-11. See also p. 5, lines 5-9).

When the motor 14 applies force in a second direction, it drives the output member 18 from the actuated condition to the rest condition. The force applied by the motor 14 drives the

output member 18 in the opposite direction of the biasing force in the spring 20, causing the spring 20 to compress and store energy (p. 3, lines 13-19).

Because the motor 14 drives the output member 18 in two different directions, the motor 14 can be assisted by the biasing force of the spring 20 when applying force in the first direction and can apply an opposing force onto the spring 20 when applying force in the second direction.

VI. REFERENCES OF RECORD

In the final rejection dated October 31, 2002, the Examiner relied upon U.S. Patent No. 5,180,038 to Arnold et al. ("Arnold").

VII. ISSUES

Is the final rejection of claims 1-7 and 15-21 under 35 U.S.C. § 102(b) as being anticipated by Arnold improper?

VIII. GROUPING OF CLAIMS

For purposes of this Appeal Brief, the claims are grouped as follows:

A. Independent claim 1 stands or falls alone;

B. Independent claim 21 stands or falls alone;

C. Claim 2 stands or falls alone;

D. Claims 3 and 4 stand or fall together;

E. Claims 5, 6, and 7 stand or fall together;

F. Claim 15 stands or falls alone;

G. Claim 16 stands or falls alone;

H. Claim 17 stands or falls alone;

I. Claims 18 and 19 stand or fall together;

J. Claim 20 stands or falls alone.

IX. ARGUMENTS

A. Arnold Fails to Anticipate Independent Claim 1.

In the Advisory Action, the Examiner asserted, "It is well known in the art that a reversible motor is configured to product a rotational output capable of rotating in opposite directions." Appellant respectfully notes that this argument focuses on the wrong movement. Independent claim 1, for example, clearly recites that the actuator is operable "to apply a force in a first direction to drive said output member in the first direction from a rest condition to an actuated condition, and also being operable to apply a force in a second direction to drive said output member in the second direction from said actuated condition to said rest condition." In other words, the claimed actuator applies force in two different directions rather than simply moving (e.g., rotating) in two different directions.

As explained throughout prosecution, the reversible motor in Arnold rotates in two different directions but does not apply force in two different directions. Instead, the electric motor 50 in Arnold applies force in the same, single direction for both brake release and brake actuation. More particularly, to release a parking brake, Arnold teaches driving the electric motor 50 to apply a force to the left against the biasing force of a compression spring, thereby displacing a movable member 8 to the left until the member 8 reaches a brake-released position. The member 8 is retained in the brake-released position by cooperation between a clutch spring 70 and a drive screw 36 (col. 5, line 64 to col. 6, line 20). In other words, the electric motor 50 in Arnold applies a force to the left to drive the member 8 to the left.

When the parking brake is actuated, the drive screw 36 is released, allowing the member 8 to move to the right via expansion of the compression spring 30. The member 8 is driven by forces in the spring 30, not the motor 50, to the brake actuation position. More particularly, the compression spring 30 expands, applying a biasing force to the right to move the member 8 to the right.

The motor 50 controls the return travel speed of the member 8 as the travel member 8 moves to the right, but does not move the output member in a second direction, as alleged by the Examiner. Because the biasing force of the spring 30 is toward the right and therefore moves the member 8 toward the right, any force applied by the motor 50 to control the member's return

travel speed must be applied to the left, against the biasing force of the compression spring 30. This is true regardless of the direction in which the motor 50 is driving the drive screw 36; the motor 50 is either applying force to the left to compress the spring 30 or applying force to the left to control the spring's 30 expansion toward the right.

Thus, regardless of the travel direction of the member 8, the motor 50 always applies a force in a single direction (i.e., to the left), either to move the member 8 to the brake-release position or to slow the member 8 as it is being driven in the opposite direction by the biasing force of the compression spring 30 to the brake-actuated position. In both rotational directions, the motor 30 applies a force toward the left. The motor 50 does not drive or actuate in the same direction as the spring 30 – it only applies compression force onto the spring or limits the spring biasing force, applying force against the spring force in both cases. The only difference is the amount of force applied against the spring force by the motor 50; the direction of the force from the motor never changes.

Independent claim 1, by contrast, clearly recites applying a force in a first direction and a second direction to drive the output member to and from the actuated condition, respectively. In other words, the claimed actuator applies force in two different directions depending on whether the output member is to be moved to the actuated condition or to the rest condition. When the actuator applies force in the first direction, the force from the actuator assists the force from the energy storing member to move the output member. When the actuator applies force in the second direction, the actuator moves the output member to store energy in the energy storing member.

The Examiner has not shown where Arnold discloses using the motor 50 to assist the spring force (i.e., applying a force that is in the same direction as the spring force). Contrary to the Examiner's assertions during prosecution, Arnold does not teach using the reversible motor to assist the spring force if the spring force is not sufficient to actuate the brake cable due to a malfunctioning brake component. In fact, Arnold does not mention brake component malfunctions at all. Every description assumes that the any force applied by the motor 50 is toward the left, against the biasing force of the spring 30 (see: col. 3, line 65 to col. 4 line 39; col. 5, line 64 to col. 6, line 20; col. 7, lines 46-52). In Arnold, the motor 50 either moves against the

spring force a large amount to compress the spring or a smaller amount to control the biasing force of the spring. In both cases, the motor 50 is applying a force against the spring biasing force. Even the claims in Arnold assume that the motor drives the movable member only in a direction that is opposite to the spring biasing force direction (col. 7, lines 46-52).

Arnold does show a reversible motor that rotates in two directions, but the force applied by the motor is always in a single direction: against the biasing force of the spring 30. By focusing solely on the two rotational directions of the motor in Arnold, the Examiner overlooks the clear recitation of claim 1, which addresses not only the operational direction of the actuator, but also the direction of the force and its effect on the energy storing member.

Because Arnold fails to show a motor that drives an output member in two directions to assist or store energy in an energy storing member, dependent on the driving direction, Arnold fails to anticipate independent claim 1. The final rejection of claim 1 is therefore improper and should be withdrawn.

B. Arnold Fails to Anticipate Independent Claim 21.

As explained above, Arnold fails to disclose an actuator that applies force in two different directions to drive an output member between a rest condition and an actuated condition. Thus, Arnold also fails to disclose a method that includes driving an actuator to apply force in two different directions. Although Arnold does show a reversible motor, the reversible motor applies force in a single direction regardless of the rotational direction of the motor. More particularly, the motor in Arnold applies a force that is opposite the direction of the spring biasing force either to compress the spring or limit the spring biasing force. Neither operational case involves using the motor in Arnold to assist driving an output member in any way. The only difference is the amount of force applied against the spring force by the motor; the direction of the force from the motor never changes.

Independent claim 21, by contrast, specifically recites driving the actuator to apply force in two different directions. One of the directions is in the same direction as the stored energy force in the energy storing member, thereby allowing the stored energy force to assist the force

from the actuator to drive the output member. The other direction drives the output member in a second direction and causes the energy storing member to store energy.

Because Arnold teaches an actuator that applies force in only one direction (against the spring biasing force), Arnold fails to anticipate independent claim 21. The rejection of independent claim 21 is therefore improper and should be withdrawn.

C. Arnold Fails to Anticipate Claim 2.

Claim 2 depends on independent claim 1 and is therefore not anticipated by Arnold for the reasons explained above. Although Arnold generally shows that the motor 50 is operably connected to the spring 30 via a screw shaft 36 in a transmission path, the motor 50 does not apply force in two different directions to drive the output member and act upon the spring 30 in the claimed manner. The rejection of claim 2 is therefore improper and should be withdrawn.

D. Arnold Fails to Anticipate Claims 3 and 4.

Claims 3 and 4 depend on independent claim 1 and are therefore not anticipated by Arnold for the reasons explained above. Arnold discloses a clutch spring 70 that can restrain or release the spring 30, but this structure is not associated with an actuator assembly having an actuator that is operable to apply force in two different directions, as noted above. The rejection of claims 3 and 4 is therefore improper and should be withdrawn.

E. Arnold Fails to Anticipate Claims 5, 6, and 7.

Claims 5, 6 and 7 depend on claim 1 and are therefore not anticipated by Arnold for the reasons explained above. In the final Office Action, the Examiner asserted that Arnold shows a friction detent mechanism 70 (p. 3), which Arnold discloses as a helical clutch spring 70. The action of this helical clutch spring 70 displaces the moveable member 8 toward the brake release condition, but the clutch spring 70 is mounted on the drive screw 36, not the movable member 8 (col. 4, lines 12-28). Further, the clutch spring 70 does not act substantially perpendicularly to the movable member 8; as shown in Figure 2, the legs of the clutch spring 70 rotate around the drive screw 36 and do not act radially inwardly or outwardly with respect to the drive screw 36 or

the movable member 8. The rejection of claims 5, 6 and 7 are therefore improper and should be withdrawn.

F. Arnold Fails to Anticipate Claim 15.

Claim 15 depends on claim 1 and is therefore not anticipated by Arnold for the reasons explained above. Arnold does not disclose an output member driven in two different linear directions by an actuator that also applies force in two different directions. The rejection of claim 15 is therefore improper and should be withdrawn.

G. Arnold Fails to Anticipate Claim 16.

Claim 16 depends on claim 1 and is therefore not anticipated by Arnold for the reasons explained above. In the final Office Action, the Examiner argued that Arnold shows a drive screw 36 that could be considered similar to the worm wheel 24, which was interpreted as being a rotational output member. Appellant respectfully notes, however, that the specification states that the output member 50 can move in a rotational direction (p. 5, lines 10-14). Regardless of the specific interpretation of claim 16, Arnold fails to disclose the invention of claim 16 because Arnold fails to show any output member that is driven in the two rotational directions by an actuator that applies force in two different directions. The rejection of claim 16 is therefore improper and should be withdrawn.

H. Arnold Fails to Anticipate Claim 17.

Claim 17 depends on claim 1 and is therefore not anticipated by Arnold for the reasons explained above. Arnold does mention that the main spring 30 expands to move the moveable member 8 toward the right (col. 6, lines 31-39) but, as explained above, Arnold fails to teach an actuator that applies force in two different directions to drive the member 8 in two different directions. More particularly, Arnold teaches that the motor 50 applies force only toward the left at all times, against the right-ward biasing force of the spring 30. The rejection of claim 17 is therefore improper and should be withdrawn.

I. Arnold Fails to Anticipate Claims 18 and 19.

Claims 18 and 19 depend on claim 1 and are therefore not anticipated by Arnold for the reasons explained above. Claims 18 and 19 recite specific structures of the energy storage member. Although Arnold does illustrate a main compression spring 30, the motor 50 in Arnold does not ever assist the spring 30 in driving the output member. Instead, the motor 50 only applies a force that is opposite to the biasing force of the spring 30 in varying degrees to either compress the spring 30 or reduce the force applied by the spring 30. The rejection of claims 18 and 19 is therefore improper and should be withdrawn.

J. Arnold Fails to Anticipate Claim 20.

Claim 20 depends on claim 1 and is therefore not anticipated by Arnold for the reasons explained above. Although Arnold generally shows a housing, the components within that housing are not the same as those in the claimed invention, as noted above. The rejection of claim 20 is therefore improper and should be withdrawn.

X. CONCLUSION

For the reasons set forth above, the final rejection of claims 1-7 and 15-21 is improper and should be withdrawn.

Respectfully submitted,

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Dated: March 27, 2003

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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail, postage prepaid, in an envelope addressed to Assistant Commissioner of Patents, Box AF, Washington DC 20231 on this 27th day of March, 2003.

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XI. APPENDIX

Claims on appeal

1. An actuator assembly comprising:

an actuator drivingly connected by a transmission path to an output member, said actuator being operable to apply a force in a first direction to drive said output member in the first direction from a rest condition to an actuated condition, and also being operable to apply a force in a second direction to drive said output member in the second direction from said actuated condition to said rest condition; and

an energy storing member, in which movement of said output member by said actuator in said first direction is assisted by said energy storing member and movement of said output member by said actuator in said second direction stores energy in said energy storing member.

2. The actuator assembly as recited in claim 1 wherein said actuator is operably connected to said energy storing member by at least a portion of the transmission path.

3. The actuator assembly as recited in claim 1 wherein said actuator assembly further comprises a retaining arrangement to releasably retain said actuator assembly in said rest condition.

4. The actuator assembly as recited in claim 3 wherein said retaining arrangement is partially provided by friction associated with at least one of said actuator, said transmission path and said output member.

5. The actuator assembly as recited in claim 3 wherein said retaining arrangement is provided by a detent arrangement.

6. The actuator assembly as recited in claim 5 wherein said detent arrangement acts upon said output member.

7. The actuator assembly as recited in claim 6 wherein said detent arrangement acts substantially perpendicularly to a direction of movement of said output member.

15. The actuator assembly as recited in claim 1 wherein said first and second directions of movement of said output member are linear.

16. The actuator assembly as recited in claim 1 wherein said first and second directions of movement of said output member are rotational.

17. The actuator assembly as recited in claim 1 wherein said energy storage member acts on said output member.

18. The actuator assembly as recited in claim 1 wherein said energy storage member is a resilient member.

19. The actuator assembly as recited in claim 18 wherein said resilient member is a spring.

20. The actuator assembly as recited in claim 1 wherein said actuator assembly further comprises a housing which at least partially contains said actuator, said transmission path and said output member.

21. A method of operating an actuator assembly having an actuator, an output member, and an energy storing member, comprising:

driving the actuator to apply a force in a first direction to drive the output member in the first direction from a rest condition to an actuated condition;

applying a stored energy force from the energy storing member in the first direction to assist the actuator in driving the output member in the first direction;

driving the actuator to apply a force in a second direction to drive the output member in the second direction from the actuated condition to the rest condition; and

storing energy in the energy storing member when the actuator applies the force in the second direction.